

Name: _____

UNIT TEST #2: ALGEBRA SKILLS

11U

54
(5 marks)

1. Simplify.

a) $3(x+3)^2 - (5x-1)(x+2)$

b) $(2x-3)(x^2-x-1)$

$= 3(x^2 + 6x + 9) - (5x^2 + 9x - 2)$ $= 2x^3 - 2x^2 - 2x - 3x^2 + 3x \checkmark$

$= 3x^2 + 18x + 27 - 5x^2 - 9x + 2$ $= 2x^3 - 5x^2 + x + 3 \checkmark$

$= -2x^2 + 9x + 29 \checkmark$

5

2. Simplify.

(5 marks)

a) $2\sqrt{98} + 3\sqrt{72} - \sqrt{162} - 3\sqrt{50}$

$= 2(7)\sqrt{2} + 3(6)\sqrt{2} - 9\sqrt{2} - 3(5)\sqrt{2} \checkmark$

$= 14\sqrt{2} + 18\sqrt{2} - 9\sqrt{2} - 15\sqrt{2} \checkmark$

$= 8\sqrt{2} \checkmark$

5

b) $2\sqrt{3}(3\sqrt{2} + \sqrt{3})$

$= 6\sqrt{6} + 2(3) \checkmark$

$= 6\sqrt{6} + 6 \checkmark$

10

Name: _____

$$\begin{array}{r} 13 \\ 31 \\ \hline 7 \end{array}$$

3. Factor fully.

a) $15x^3 - 5x^2 + 35x$

$$= 5x(3x^2 - x + 7) \checkmark \checkmark$$

$$\begin{array}{r} 123 \\ 1856 \\ \hline 31 \end{array}$$

(14 marks)

b) $18x^2 + 25x - 3$

$$= (2x + 3)(9x - 1) \checkmark$$

4

$$\begin{array}{r} 12 \\ 63 \\ \hline 3 \end{array}$$

c) $(x-1)^2 + 5(x-1) + 6$

$$\begin{aligned} &= [(x-1) + 2][(x-1) + 3] \\ &= (x+1)(x+2) \checkmark \checkmark \end{aligned}$$

4

d) $4(x+2)^2 - 9y^2$

$$\begin{aligned} &= [2(x+2) + 3y][2(x+2) - 3y] \\ &= (2x+4+3y)(2x+4-3y) \checkmark \checkmark \end{aligned}$$

e) $(x^2+1)^2 - 2x^3 - 2x$

$$\begin{aligned} &= (x^2+1)^2 - 2x(x^2+1) \\ &= (x^2+1)[(x^2+1) - 2x] \checkmark \\ &= (x^2+1)(x^2 - 2x + 1) \checkmark \\ &= (x^2+1)(x-1)^2 \checkmark \end{aligned}$$

6

f) $x^3 - 2x^2y - 3x^2 + 6yx$

$$\begin{aligned} &= x(x^2 - 2xy - 3x + 6y) \\ &= x[x(x-2y) - 3(x-2y)] \checkmark \\ &= x(x-3)(x-2y) \checkmark \end{aligned}$$

14

Name: _____

4. Solve each inequality. Then graph. (6 marks)

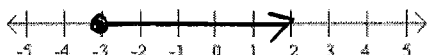
a) $-3(3x + 1) \leq 2(9 - x)$

$-9x - 3 \leq 18 - 2x$

$-9x + 2x \leq 21$

$-7x \leq 21$

$x \geq -3$



b) $2x < x + 6 < 4x$

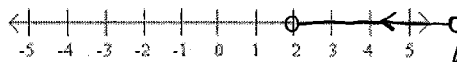
$2x < x + 6$

$x < 6$

$x + 6 < 4x$

$6 < 3x$

$2 < x$



5. Simplify. State restrictions on x. (12 marks)

a) $\frac{2x-8}{x^2-16} \cdot \frac{x^2-9}{2x+6}$

$= \frac{2(x-4)}{(x-4)(x+4)} \cdot \frac{(x-3)(x+3)}{2(x+3)}$

$= \frac{(x-3)}{(x+4)}$; $x \neq 4, -4, -3$

b) $\frac{2x^2-14x+24}{4x^2-64} \div \frac{x^2-8x+15}{x^2-x-20}$

$= \frac{2(x^2-7x+12)}{4(x^2-16)} \cdot \frac{(x^2-x-20)}{(x^2-8x+15)}$

$= \frac{2(x-4)(x-3)}{4(x+4)(x-4)} \cdot \frac{(x+4)(x-5)}{(x-3)(x-5)}$

$= \frac{1}{2}$; $x \neq -4, 4, 3, 5$

Name: _____

6. Simplify. State restrictions on x .

(12 marks)

a) $\frac{2x}{3} + \frac{x}{4} - \frac{x}{2}$

$= \frac{8x}{12} + \frac{3x}{12} - \frac{6x}{12}$

$= \frac{5x}{12}$

b) $\frac{x+2}{x+1} + \frac{x-1}{x-3}$

$= \frac{(x+2)(x-3) + (x-1)(x+1)}{(x+1)(x-3)}$

$= \frac{x^2 - x - 6 + x^2 - 1}{(x+1)(x-3)}$

$= \frac{2x^2 - x - 7}{(x+1)(x-3)}$; $x \neq -1, 3$

c) $\frac{2x-1}{9x^2-1} - \frac{2x+1}{3x^2+4x+1}$

$= \frac{2x-1}{(3x-1)(3x+1)} - \frac{2x+1}{(x+1)(3x+1)}$

$= \frac{(2x-1)(x+1) - (2x+1)(3x-1)}{(3x-1)(3x+1)(x+1)}$

$= \frac{2x^2 + x - 1 - (6x^2 + x - 1)}{(3x-1)(3x+1)(x+1)}$

$= \frac{-4x^2}{(3x-1)(3x+1)(x+1)}$; $x \neq \frac{1}{3}, -\frac{1}{3}, -1$

3

4

5

12